



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/783,179	02/12/2001	Robert Pulford JR.	226-133	6009

21091 7590 10/24/2002

JOHN H CROZIER  
1934 HUNTINGTON TURNPIKE  
TRUMBULL, CT 06611

EXAMINER

JONES, JUDSON

ART UNIT PAPER NUMBER

2834

DATE MAILED: 10/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/783,179

Applicant(s)

PULFORD, ROBERT

Examiner

Judson H Jones

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-24 is/are pending in the application.
- 4a) Of the above claim(s) 17-22 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23 and 24 is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7-12 and 14-16 is/are rejected.
- 7) ☒ Claim(s) 2 and 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_

### **DETAILED ACTION**

Applicant's arguments with respect to claims 1-4, 8-12 and 14-16 have been considered but are moot in view of the new ground(s) of rejection.

#### **Numbering of Claims**

The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 17 and 18 have been renumbered 23 and 24.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 5 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Independent claim 1 recites "said ... permanent magnet shaft is formed from one homogeneous piece of material." Dependent claim 3 recites that the shaft has a solid core. Dependent claim 5 then recites that the solid core is formed from a non-magnetic material. Since the core is a part of the permanent magnet shaft that is formed from a homogeneous piece of material, then the core and the rest of the shaft have to be made from the same magnetic material.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 3, 4, 8-10, 12, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanba 5,949,162 in view of Gogue 4,575,652 (of record) and Onodera et al. 4,504,750 (of record). In figure 1(A) Nanba discloses a linear motor with an annular structure and an axially extending cylindrical motor shaft having a smooth external surface and axially alternating N and S poles, with the shaft formed from a single piece of material as described in column 7 lines 5-9 but does not disclose the linear motor being a linear stepping motor or discloses the annular structure as being a stator. In regard to the limitation of "axially alternating N and S poles," that phrase is read as meaning N and S poles that are alternately positioned in an axial direction. In his arguments of 9/10/02, Applicant argues the limitation means alternating N and S poles that are magnetized in the axial direction. While the limitation could be read as meaning what Applicant argues it means, that is not the broadest reasonable interpretation of the claim. In regard to the annular structure being the stator limitation, Gogue teaches in column 3 lines 7-23 that either member of a motor can be made fixed and the other member made movable. Since Gogue and Nanba are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have made the permanent magnet shaft of Nanba movable where the force of the motor was needed to move the shaft of a machine. In regard to the stepping motor claimed, Onodera et al. teaches in column 6 lines 36-42 that both linear stepping motors and electronic commutator linear motors are known in the art, with stepping motors being of a simpler construction because stepping motors don't require position detecting means and non-contact current feeding means. Since Onodera et al.

Art Unit: 2834

and Nanba as modified by Gogue are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have made the device of Nanba as modified by Gogue into a linear stepping motor in order to simplify the construction of the motor.

In regard to claims 3 and 4, Nanba shows a permanent magnet shaft in figure 1(B) having a solid ferromagnetic core.

In regard to claim 8, the linear stepping motor of Nanba can rotate in any direction. The entire device as shown in figure 2(B) includes a carriage 31 and a roller r and thus the entire device cannot be rotated in any orientation. However as long as the linear motor has bearings, nothing in the linear motor restricts the rotation of the motor to any direction.

In regard to claim 9, see Nanba column 5 lines 56-59. Since the motor is reciprocating, the motor is constructed so that the shaft can move in both directions.

In regard to claim 10, the linear stepping motor of Nanba can operate in any orientation. The entire device as shown in figure 2(B) includes a carriage 31 and a roller r and thus the entire device cannot be operated in any orientation. However as long as the linear motor has bearings, nothing in the linear motor restricts the operation to of the motor to any orientation. See column 7 lines 40-45.

In regard to claim 12, see Nanba column 7 lines 32-44.

In regard to claim 14, see the entire specification of Nanba where no lead screw or ball screw is mentioned.

In regard to claim 16, see Nanba column 1 lines 44-48 for a description of a prior art device and see column 2 lines 37-45 for a description of the Nanba device.

Claim 7 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The limitation of the shaft being made from a homogeneous piece of material has been added to claim 1.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanba as modified by Godue, Onondera et al. as applied to claim 1 and further in view of Karidis et al. (of record). Nanba as modified by Gogue and Onodera et al. discloses the linear stepping motor but does not disclose modular stator stacks. However, Karidis et al. discloses modular stator stacks in column 4 lines 18-23 and teaches that using modular stacks makes it easy to assemble a motor with enough power to do the intended job. Since Karidis et al. and Nanba as modified by Gogue and Onodera et al. are both from the same field of endeavor, it would have been obvious for one of ordinary skill in the art to have utilized modular stator stacks in the device of Nanba as modified by Gogue and Onodera et al. in order to make the assembling of motors having varying power easier.

Claims 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanba as modified by Gogue, Onodera et al. and Enomoto et al. (of record). Nanba as modified by Gogue and Onodera et al. discloses the linear stepping motor but uses bearings in the motor as described in column 7 lines 42-45. However, Enomoto et al. teaches using magnetic bearings in the abstract. Since Enomoto et al. and Nanba as modified by Gogue and Onodera et al. are both from the same field of endeavor, it would have been obvious for one of ordinary skill in the art to have utilized magnetic bearings which require no lubrication in the motor of Nanba as modified by

Gogue and Onodera et al. when the motor was intended for use in a clean room, such as the ones used for semiconductor device fabrication.

*Allowable Subject Matter*

Claims 23 and 24 are allowed.

Claims 2 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or teach an axially extending cylindrical permanent magnet shaft made from a homogeneous piece of material that is hollow as recited in claim 2. Ishiyama et al. (of record) discloses a hollow shaft but the shaft is constructed from a number of washer shaped magnetic pieces. The prior art of record does not disclose or teach a stator structure including disks of a high lubricity material spacing apart elements of a stator structure as recited in claims 6 and 24. Langley 4,286,180 teaches placing TEFLON in the spaces between the teeth of a movable annular member in column 5 lines 11-16. Applying the teaching of Langley to Nanba is not obvious since Nanba has no teeth in his device. Furthermore Langley places TEFLON on the movable member, not the stator. The prior art of record does not disclose or teach a linear stepping motor having an axially extending, cylindrical permanent magnet shaft having a solid core of a non-magnetic material as recited in claim 23. Ishiyama et al. only teaches placing a magnetic material inside of a cylindrical permanent magnet shaft to increase the magnetic flux and thus increase the driving force of the motor.


Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JHJ   
October 15, 2002

  
NESTOR RAMIREZ  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800